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(81) Designated States *(national)*: AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE

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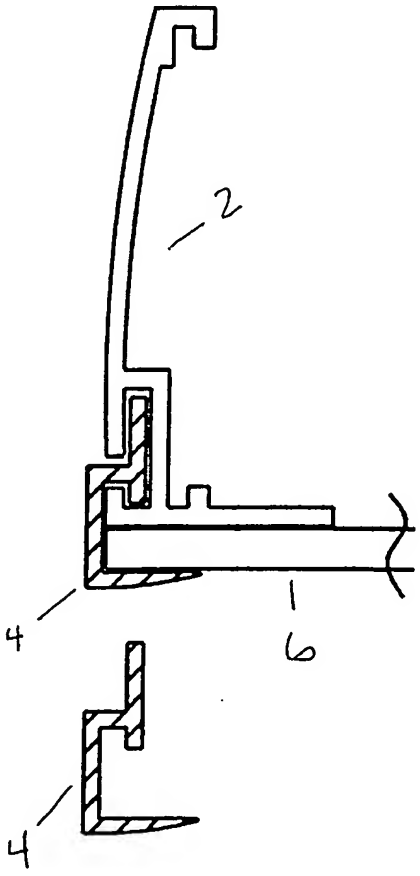
(54) Title: DECORATIVE STRUCTURE AND CEILING SYSTEM



(57) Abstract: Disclosed is a decorative structure and system including a flexible ceiling panel maintained in a flexed configuration. The flexed configuration may be arranged in various configurations having different degrees of flex or curvature in the individual decorative structures. The system includes a flexible panel supported by a frame. The frame can be configured such that the flexible panel takes on a wave like appearance which is imparted by the curved structure of the frame.

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DECORATIVE STRUCTURE AND CEILING SYSTEM

TECHNICAL FIELD

The present invention relates generally to a decorative structure and more particularly to structures suspended from a ceiling.

BACKGROUND

Traditional suspended ceiling systems which are formed from suspended grids of acoustically absorbent tiles are commonly found in commercial work spaces such as professional offices. While such systems provide a pleasant and acoustically absorbent space, designers and architects who desire to create the feel of an open loft space often object to the uniformity and lowered ceiling height created by conventional drop ceilings. Thus, more and more businesses are opting for so-called open plenum ceiling designs. In the open plenum, no suspended ceiling is provided. Rather, the hard deck or hard ceiling of the building along with the HVAC duct work, wiring and the like are exposed. Open plenum ceilings are more commonly found in retail stores and similar commercial settings, but also can be found in office spaces.

In attempting to further define a space within the open plenum layout, many designers use reconfigurable partitions that may be considerably lower than the hard

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ceiling. Furthermore, depending upon the structure of an in-door space, an open plenum design, combined with a lack of interior walls, tend to leave the space unstructured and less useful and aesthetically unpleasing.

To differentiate a space and to create a more interesting visual in a loft style space or open plenum design architects will specify that an open loft space be broken up by customized decorative structures suspended from the ceiling to differentiate the space within the room. Furthermore, such suspended structures are used to dampen extraneous noise while creating an interesting visual. Unfortunately, such decorative structures must be prefabricated into the desired shape specified before installation. Additionally, such prefabricated shapes are difficult to ship or mass produce. Further, such decorative structures tend to be customized pieces requiring considerable expense to fabricate.

SUMMARY

The present invention provides a decorative structure and system including a flexible ceiling panel maintained in a flexed configuration by a frame. The flexed configuration may be arranged in various configurations having different degrees of flex or curvature in the individual decorative structures. The system includes a flexible panel supported by a frame. The frame can be configured such that the flexible panel takes on a wave like appearance which is imparted by the curved structure of the frame. Thus, a relatively flat flexible panel can be configured to create a curved decorative structure.

In greater detail, the decorative structure includes a first runner and a second runner element spaced substantially parallel to the first runner. The decorative structure also includes a spreader bar spaced between and connected to both the first

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and second runner. The flexible panel may then be attached to the runners using a clip. Typically, the flexible panel may then take on the shape or form of the runners. Thus, if the curvature or wave-like form of the runners is imparted to the attached flexible panel. The decorative structure may then be suspended from ceiling.

Furthermore, the decorative structure may include a channel positioned within the first and second runners wherein the clip may be seated within the channel and engaged with the flexible panel. A modular spacing bar may be used to engage the channel positioned within the first and second runners to attach two adjacent decorative structures.

Additionally, a ceiling system is provided comprising a plurality of decorative structures suspended from a ceiling wherein the decorative structures comprise a frame, a panel and a clip attaching the panel to the frame. The ceiling system includes a modular spacer bar attached to and positioned between at least two adjacent decorative structures. Furthermore, the flexible panels may be comprised of a range of materials such as, for example, metal, wood, paper and plastic.

These and other features of the present invention will become apparent upon reading the following detailed description, when taken in conjunction with the accompanying drawings that are briefly described as follows.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Fig.1 is a prospective view of a decorative structure illustrating the clip attached to the runner and holding the flexible panel;

Fig. 2 is a prospective view of the slotted member attached to the runner and the spreader bar attached to the runner by the slotted member;

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Fig. 3 is a side view of the decorative article illustrating the spreader bar connecting the two opposed runners and the flexible panel attached to the runners by the clip;

Fig. 4 is a prospective view illustrating the spacer bar used to connect adjacent decorative articles;

Fig. 5 is a prospective view illustrating the decorative structure attached to the ceiling; and

Fig. 6 is a prospective view illustrating the decorative structure attached to both the ceiling and surrounding decorative structures.

DETAILED DESCRIPTION

The present invention provides for both a decorative structure and system for forming a flexible decorative structure. The decorative structure includes a flexible panel whose shape and form are essentially dictated by the frame holding the panel. Thus, most any material or panel may be used to form the decorative structure. Typical forms or shapes obtained by the decorative structure include waves or curves. Of course the panel may also be flat.

In further detail, the decorative structure includes a first runner and a second runner. The runners 2 form the sides of the frame. The frame may consist of two or more runners and may take any shape such as a rectangle, as is illustrated the figures. For example the frame may have two runners 2 spaced along two opposite and parallel sides while the remaining two sides may or may not have a runner. Additionally, the runners may be spaced in an oblong formation or to resemble a triangle. Furthermore the two sides may have an end cap attached which looks similar

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the runners giving the decorative structure a "finished look". The runners 2 may be made of most any material such as steel or plastic.

The frame may also contain a spreader bar 8 spaced between and connected to both the first and second runner. The spreader bar 8 aids in providing support for the frame and may used to provide an attachment point for the decorative structure to the ceiling above. Examples of acceptable spreader bars 8 include most bars that used in most conventional drop ceiling installations.

The flexible panel 6 can be formed of most any material and the system is design to provide a designer with a wide selection of materials to work from. For example, materials such as wood, metal and fiber board may be used. Additionally, materials such as glass may also be used if a flat configuration is desired. Furthermore, the flexible panel 6 may be acoustically absorbent or have sound attenuating properties.

Typically, the shape of the flexible panel 6 is imparted to it by the runners 2 such that the panel 6 conforms to the contours of the runners 2. Thus, the curvature of the runners 2 determines the shape of the attached flexible panel 6. There are any number of combinations of runners 2 which will impart a desired look to the flexible panel 6. For example, the parallel runners 2 may have substantially the same curvature or parallel runners 2 of different curvature may be used to impart an undulating wave like form to the flexible panel 6. The panels are typically attached to the runners using a clip. The decorative structure may include a channel positioned within the runners such that the clip 4 may be seated within the channel and engaged with the flexible panel 6. The clips 4 provide a resilient or friction fit with the panel 6 and the runners 6. The clip 4 may take on any conventional form for attaching and

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securing the panel to the runners. Examples of clips 4 include those which pinch or clamp the panel to the runners 2.

The decorative structure may be suspended from ceiling by use of cables or posts 14 attached to the decorative structure. The cables or posts can be attached to the spreader bar 8 placed between and attached to the opposed runners 2. Various attachment mechanisms may be used to secure the either the post or cable 14 to the spreader bar 8. Additionally, a modular spacing bar 12 may be used to space and connect the decorative structures together. Typically, the modular spacing bar 12 engages the channel positioned within the runners 2 to attach two adjacent decorative structures.

The ceiling system encompasses a plurality of decorative structures suspended from a ceiling wherein the decorative structures comprise a frame, a panel and a clip attaching the panel to the frame. The ceiling system includes a modular spacer bar 12 attached to and positioned between at least two adjacent decorative structures. Furthermore, the flexible panels 6 may be comprised of a range of materials such as, for example, metal, wood, paper and plastic.

Referring now in greater detail to the figures, wherein like numerals refer to like parts throughout the drawings. In Figure 1 the runner 2 is shown having a channel positioned within the runner for attaching the clip 4. The clip 4 holds in place the panel 6 to the runner 2. In Figure 2 the spreader bar 8 is attached to the runner 2 through the use of the slotted member 10 which is in turn attached to the runner 2 via a groove 16. Figure 3 illustrates a side view of the decorative structure showing the runner 2 connected to the slotted member 10 and the spreader bar 8 connecting the two parallel runners 2. Additionally illustrated is the panel 6 attached to the runners 2 by the clip 4.

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In Figure 4 the spacing bar 12 is illustrated wherein the spacing bar 12 is connected the runner 2 via the channel. Figure 5 depicts the decorative structure suspended from the ceiling via cabling or bars 14 connected to the spreader bar 8. Figure 6 shows multiple decorative structures suspended from the ceiling and connected to each other by the spacing bar 12.

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IN THE CLAIMS

What is claimed is:

1. A decorative structure comprising:

a first runner;

a second runner spaced from the first runner;

a spreader bar spaced between and operatively connected to both the first and second runner; and

a flexible panel operatively connected to both the first and second runner.

2. The decorative structure of claim 1, further including a channel positioned within the first and second runners.

3. The decorative structure of claim 2, further including an attachment clip engaging the channel positioned within the first and second runners.

4. The decorative structure of claim 3, wherein the attachment clip engages and attaches the flexible panel to the runners.

5. The decorative structure of claim 2, further including a modular spacing bar engaging the channel positioned within the first and second runners and the flexible panel whereby at least two adjacent decorative structures can be connected.

6. The decorative structure of claim 1, wherein the decorative structure is suspended from a ceiling.

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7. The decorative structure of claim 6, further including cables attached to the ceiling and the spreader bar.

8. The decorative structure of claim 1, wherein the first and second runners include a curved portion.

9. The decorative structure of claim 8, wherein the curved portion of the first runner is substantially similar to the curved portion of the second runner.

10. The decorative structure of claim 1, further including a slotted member resting within a groove in the runners whereby the spreader bar is attached to the frame elements by the slotted member.

11. The decorative structure of claim 1, wherein the first runner is spaced substantially parallel to the second runner.

12. A ceiling system comprising:

a plurality of decorative structures suspended from a ceiling wherein the decorative structures comprise a frame, a panel and a clip attaching the panel to the frame; and

a modular spacer bar attached to and positioned between at least two adjacent decorative structures.

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13. The ceiling system of claim 12, wherein the frame comprises at least two runners.

14. The ceiling system of claim 13, wherein the runners are substantially parallel.

15. The ceiling system of claim 13, wherein the runners include channels wherein the clip is seated.

16. The ceiling system of claim 13, further including a spreader bar spaced between and operatively connected to both the runners.

17. The ceiling system of claim 16, further including a slotted member operatively connected to each of the parallel runners for connecting the spreader bar to the parallel runners.

18. The ceiling system of claim 16, wherein the decorative structure is suspended on wires connected to the ceiling and the spreader bar.

19. The ceiling system of claim 16, wherein the decorative structure is suspended by posts connected to the ceiling and the spreader bar.

20. The ceiling system of claim 12, wherein the parallel runners include a curved portion.

21. The ceiling system of claim 20, wherein the curved portions of the runners are substantially similar.

22. The ceiling system of claim 12, wherein the flexible panel is comprised of a material selected from the group consisting of metal, wood, plastic and fiber board.

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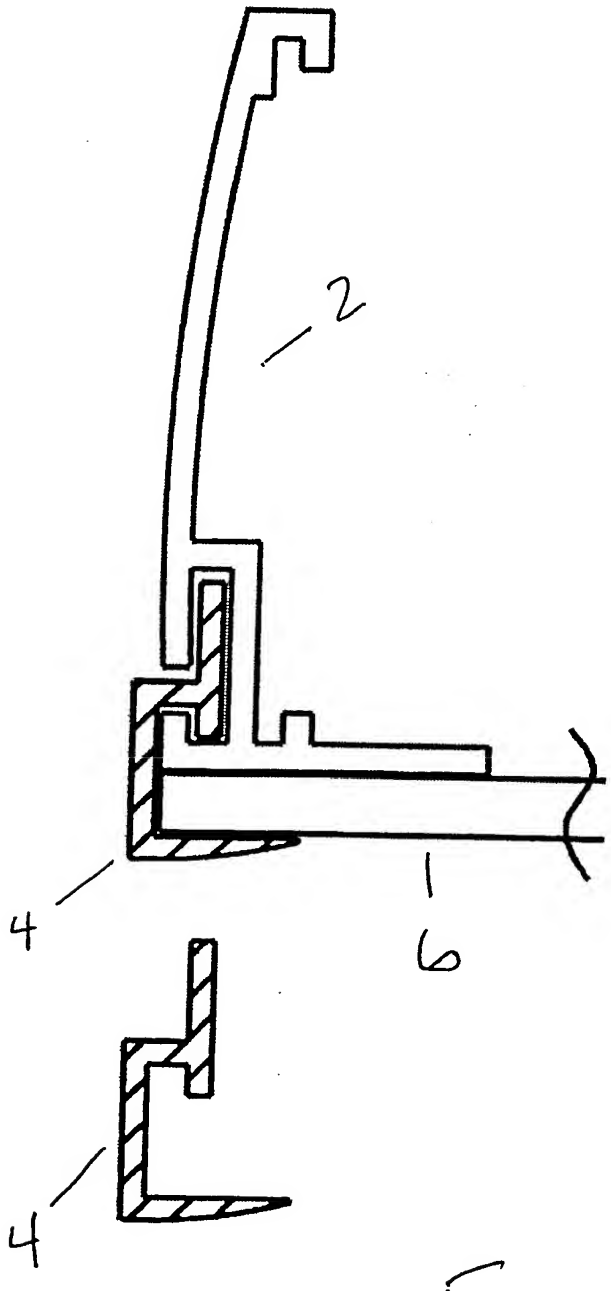

Figure 1

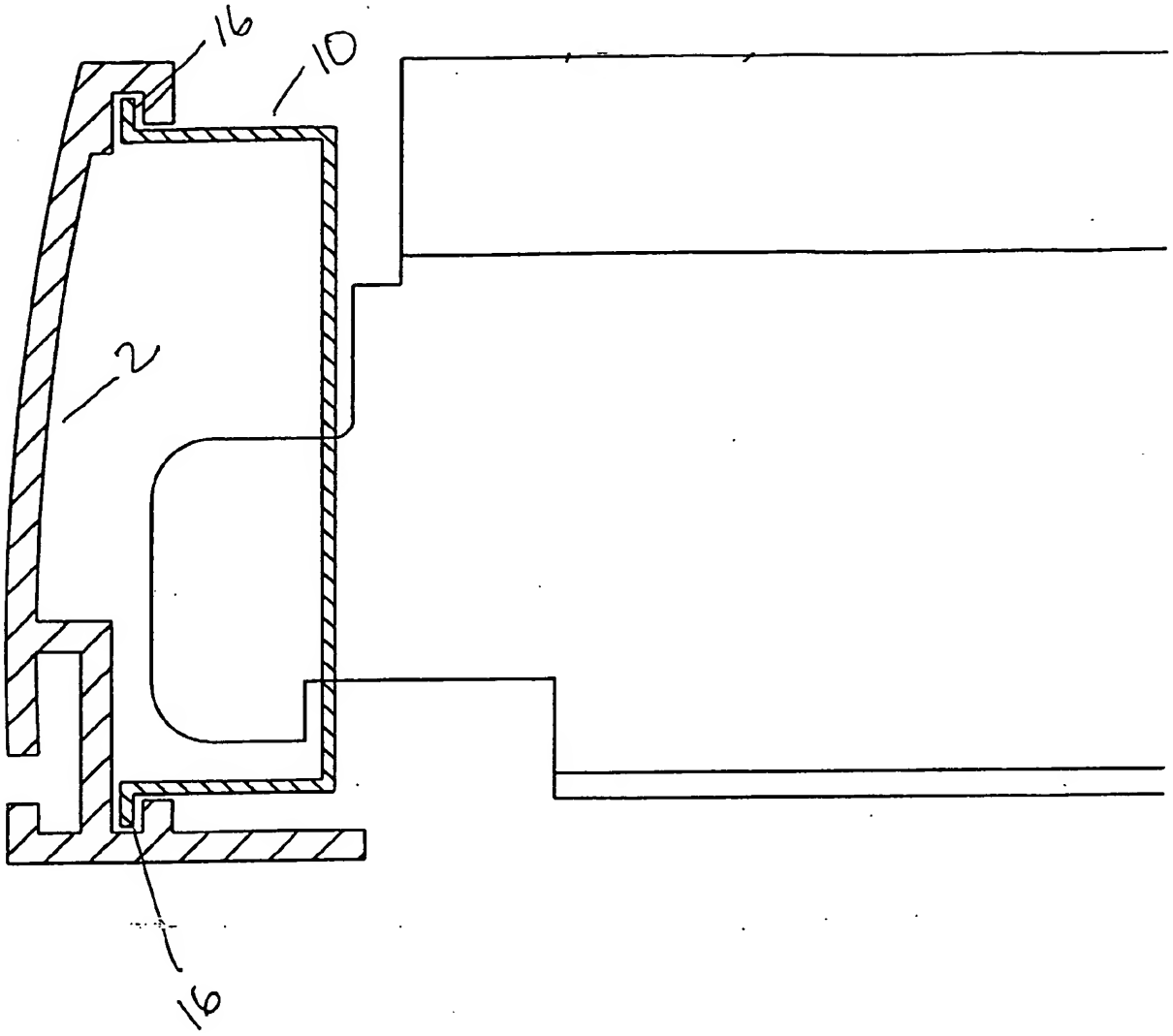

Figure 2

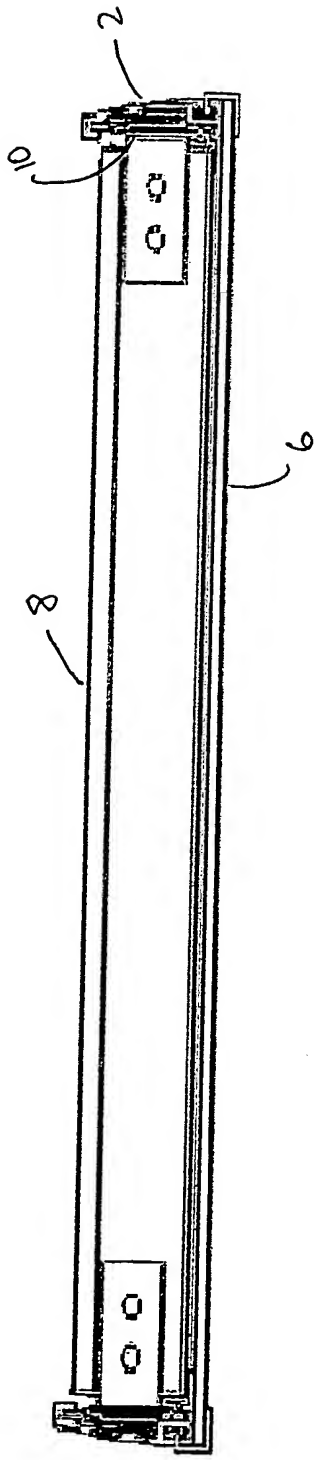

Figure 3

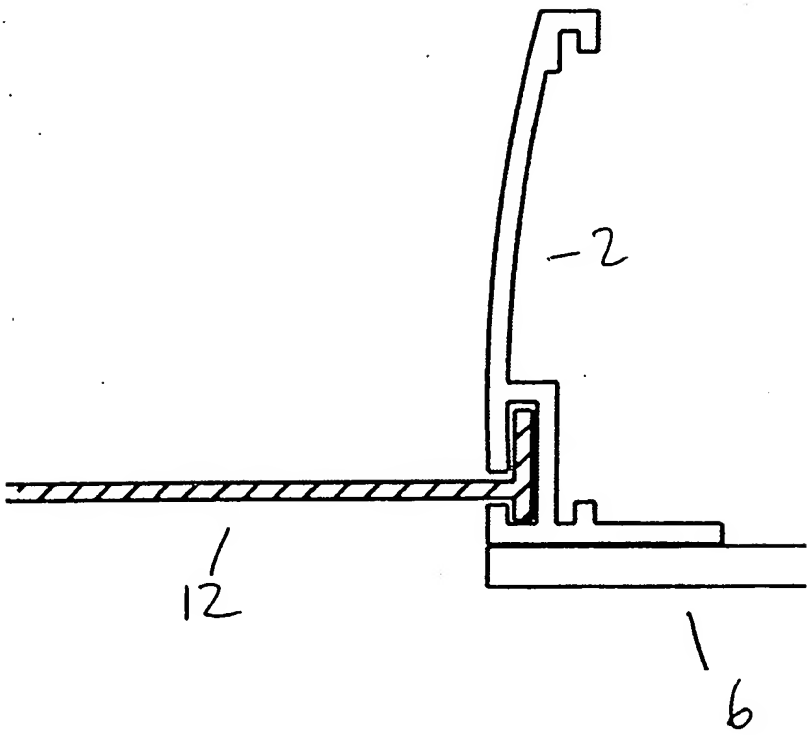

Figure 4

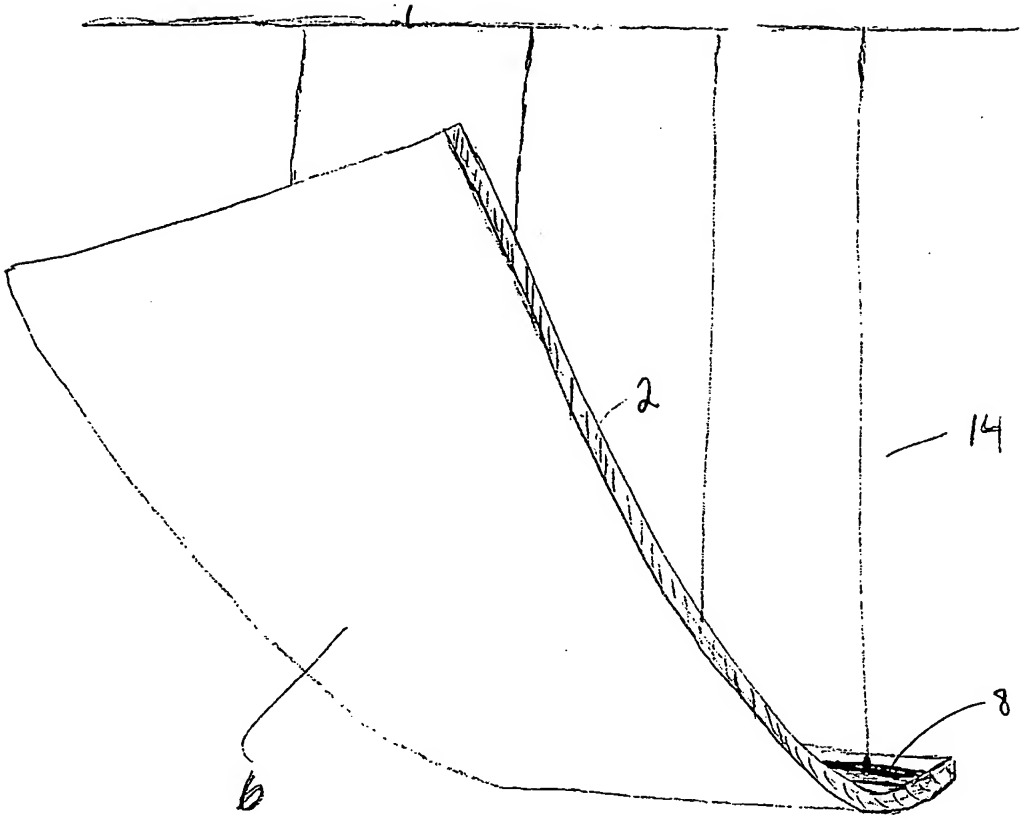

Figure 5

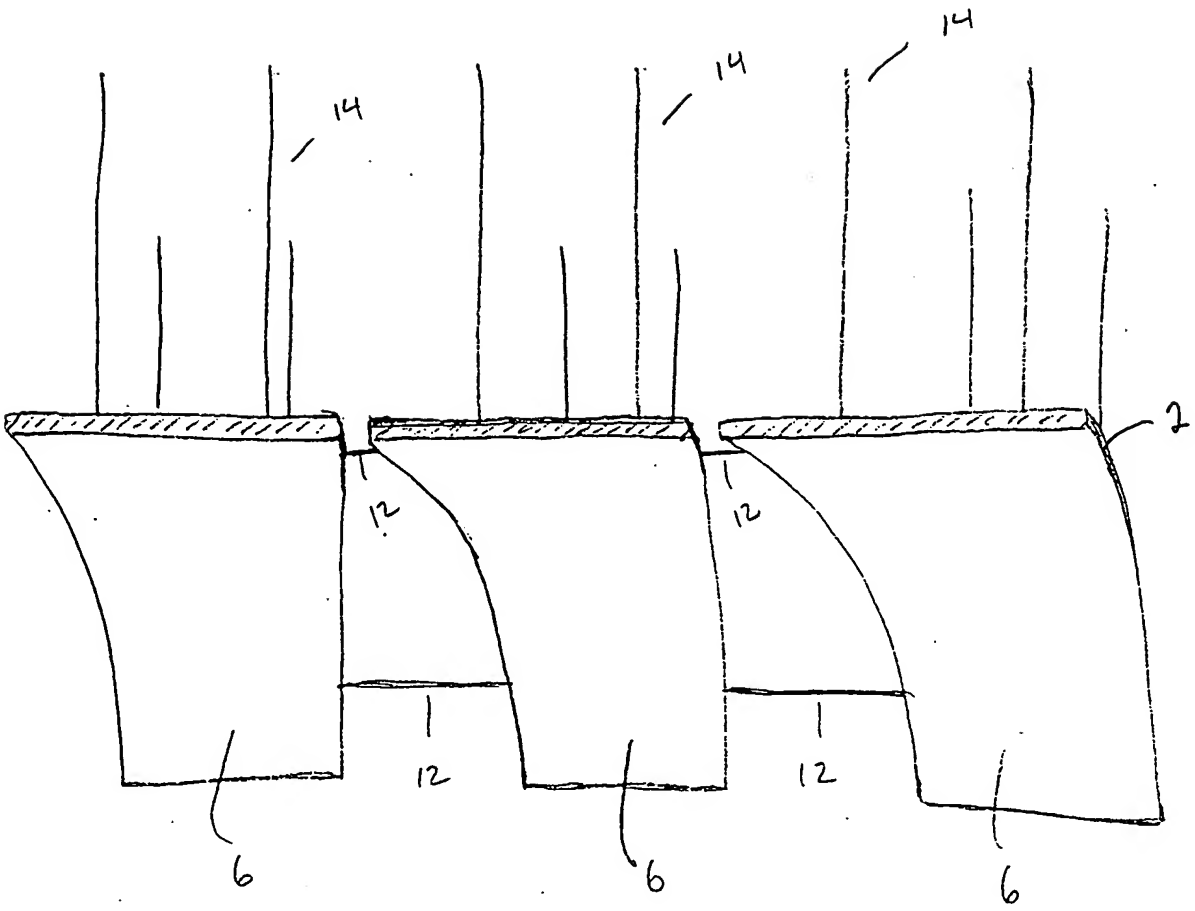

Figure 6

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 02/22947

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E04B9/34 E04B9/26 E04B9/04 E04B9/10 E04B9/12
E04B9/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	EP 1 160 389 A (USG INTERIORS) 5 December 2001 (2001-12-05) abstract; figures	1,2,6-9, 11
X A	US 6 047 512 A (WENDT ET AL.) 11 April 2000 (2000-04-11) column 5, line 25 -column 6, line 46; figures 1-8	1,2,6-9, 11 3-5,10, 12-22
X Y	US 4 744 188 A (AHREN) 17 May 1988 (1988-05-17) column 2, line 20 -column 5, line 36; figures 1-6	1-4,6,7, 10,11 5,12-19, 22
Y A	US 3 601 033 A (ROBERT LAMBERT) 24 August 1971 (1971-08-24) abstract; figures	5,12-19, 22 1-4,7

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search	Date of mailing of the international search report
25 October 2002	04/11/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Righetti, R

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 297 20 309 U (MSR) 29 January 1998 (1998-01-29) page 5, last paragraph -page 6; figures 4-6	1-4
A	US 3 875 717 A (MOELLER) 8 April 1975 (1975-04-08) figures	4,12

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
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Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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			EP	1160389 A2	05-12-2001
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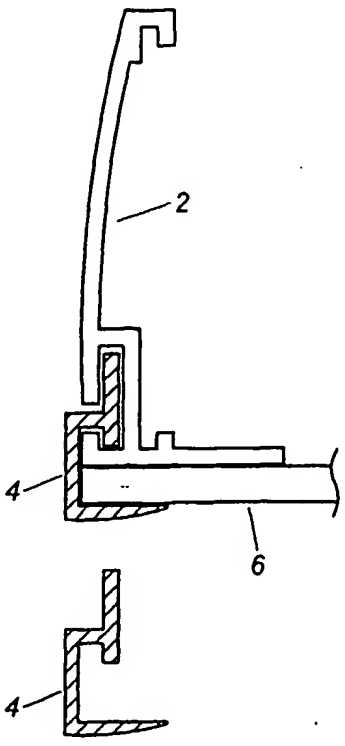

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(utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK (utility model), SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

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To differentiate a space and to create a more interesting visual in a loft style space or open plenum design architects will specify that an open loft space be broken up by customized decorative structures suspended from the ceiling to differentiate the space within the room. Furthermore, such suspended structures are used to dampen extraneous noise while creating an interesting visual. Unfortunately, such decorative structures must be prefabricated into the desired shape specified before installation. Additionally, such prefabricated shapes are difficult to ship or mass produce. Further, such decorative structures tend to be customized pieces requiring considerable expense to fabricate.

SUMMARY

The present invention provides a decorative structure and system including a flexible ceiling panel maintained in a flexed configuration by a frame. The flexed configuration may be arranged in various configurations having different degrees of flex or curvature in the individual decorative structures. The system includes a flexible panel supported by a frame. The frame can be configured such that the flexible panel takes on a wave like appearance which is imparted by the curved structure of the frame. Thus, a relatively flat flexible panel can be configured to create a curved decorative structure.

In greater detail, the decorative structure includes a first runner and a second runner element spaced substantially parallel to the first runner. The decorative structure also includes a spreader bar spaced between and connected to both the first

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and second runner. The flexible panel may then be attached to the runners using a clip. Typically, the flexible panel may then take on the shape or form of the runners. Thus, if the curvature or wave-like form of the runners is imparted to the attached flexible panel. The decorative structure may then be suspended from ceiling.

Furthermore, the decorative structure may include a channel positioned within the first and second runners wherein the clip may be seated within the channel and engaged with the flexible panel. A modular spacing bar may be used to engage the channel positioned within the first and second runners to attach two adjacent decorative structures.

Additionally, a ceiling system is provided comprising a plurality of decorative structures suspended from a ceiling wherein the decorative structures comprise a frame, a panel and a clip attaching the panel to the frame. The ceiling system includes a modular spacer bar attached to and positioned between at least two adjacent decorative structures. Furthermore, the flexible panels may be comprised of a range of materials such as, for example, metal, wood, paper and plastic.

These and other features of the present invention will become apparent upon reading the following detailed description, when taken in conjunction with the accompanying drawings that are briefly described as follows.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Fig.1 is a prospective view of a decorative structure illustrating the clip attached to the runner and holding the flexible panel;

Fig. 2 is a prospective view of the slotted member attached to the runner and the spreader bar attached to the runner by the slotted member;

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Fig. 3 is a side view of the decorative article illustrating the spreader bar connecting the two opposed runners and the flexible panel attached to the runners by the clip;

Fig. 4 is a prospective view illustrating the spacer bar used to connect adjacent decorative articles;

Fig. 5 is a prospective view illustrating the decorative structure attached to the ceiling; and

Fig. 6 is a prospective view illustrating the decorative structure attached to both the ceiling and surrounding decorative structures.

DETAILED DESCRIPTION

The present invention provides for both a decorative structure and system for forming a flexible decorative structure. The decorative structure includes a flexible panel whose shape and form are essentially dictated by the frame holding the panel. Thus, most any material or panel may be used to form the decorative structure. Typical forms or shapes obtained by the decorative structure include waves or curves. Of course the panel may also be flat.

In further detail, the decorative structure includes a first runner and a second runner. The runners 2 form the sides of the frame. The frame may consist of two or more runners and may take any shape such as a rectangle, as is illustrated the figures. For example the frame may have two runners 2 spaced along two opposite and parallel sides while the remaining two sides may or may not have a runner. Additionally, the runners may be spaced in an oblong formation or to resemble a triangle. Furthermore the two sides may have an end cap attached which looks similar

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the runners giving the decorative structure a "finished look". The runners 2 may be made of most any material such as steel or plastic.

The frame may also contain a spreader bar 8 spaced between and connected to both the first and second runner. The spreader bar 8 aids in providing support for the frame and may used to provide an attachment point for the decorative structure to the ceiling above. Examples of acceptable spreader bars 8 include most bars that used in most conventional drop ceiling installations.

The flexible panel 6 can be formed of most any material and the system is design to provide a designer with a wide selection of materials to work from. For example, materials such as wood, metal and fiber board may be used. Additionally, materials such as glass may also be used if a flat configuration is desired. Furthermore, the flexible panel 6 may be acoustically absorbent or have sound attenuating properties.

Typically, the shape of the flexible panel 6 is imparted to it by the runners 2 such that the panel 6 conforms to the contours of the runners 2. Thus, the curvature of the runners 2 determines the shape of the attached flexible panel 6. There are any number of combinations of runners 2 which will impart a desired look to the flexible panel 6. For example, the parallel runners 2 may have substantially the same curvature or parallel runners 2 of different curvature may be used to impart an undulating wave like form to the flexible panel 6. The panels are typically attached to the runners using a clip. The decorative structure may include a channel positioned within the runners such that the clip 4 may be seated within the channel and engaged with the flexible panel 6. The clips 4 provide a resilient or friction fit with the panel 6 and the runners 6. The clip 4 may take on any conventional form for attaching and

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securing the panel to the runners. Examples of clips 4 include those which pinch or clamp the panel to the runners 2.

The decorative structure may be suspended from ceiling by use of cables or posts 14 attached to the decorative structure. The cables or posts can be attached to the spreader bar 8 placed between and attached to the opposed runners 2. Various attachment mechanisms may be used to secure the either the post or cable 14 to the spreader bar 8. Additionally, a modular spacing bar 12 may be used to space and connect the decorative structures together. Typically, the modular spacing bar 12 engages the channel positioned within the runners 2 to attach two adjacent decorative structures.

The ceiling system encompasses a plurality of decorative structures suspended from a ceiling wherein the decorative structures comprise a frame, a panel and a clip attaching the panel to the frame. The ceiling system includes a modular spacer bar 12 attached to and positioned between at least two adjacent decorative structures. Furthermore, the flexible panels 6 may be comprised of a range of materials such as, for example, metal, wood, paper and plastic.

Referring now in greater detail to the figures, wherein like numerals refer to like parts throughout the drawings. In Figure 1 the runner 2 is shown having a channel positioned within the runner for attaching the clip 4. The clip 4 holds in place the panel 6 to the runner 2. In Figure 2 the spreader bar 8 is attached to the runner 2 through the use of the slotted member 10 which is in turn attached to the runner 2 via a groove 16. Figure 3 illustrates a side view of the decorative structure showing the runner 2 connected to the slotted member 10 and the spreader bar 8 connecting the two parallel runners 2. Additionally illustrated is the panel 6 attached to the runners 2 by the clip 4.

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In Figure 4 the spacing bar 12 is illustrated wherein the spacing bar 12 is connected the runner 2 via the channel. Figure 5 depicts the decorative structure suspended from the ceiling via cabling or bars 14 connected to the spreader bar 8. Figure 6 shows multiple decorative structures suspended from the ceiling and connected to each other by the spacing bar 12.

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IN THE CLAIMS

What is claimed is:

1. A decorative structure comprising:

a first runner;

a second runner spaced from the first runner;

a spreader bar spaced between and operatively connected to both the first and second runner; and

a flexible panel operatively connected to both the first and second runner.

2. The decorative structure of claim 1, further including a channel positioned within the first and second runners.

3. The decorative structure of claim 2, further including an attachment clip engaging the channel positioned within the first and second runners.

4. The decorative structure of claim 3, wherein the attachment clip engages and attaches the flexible panel to the runners.

5. The decorative structure of claim 2, further including a modular spacing bar engaging the channel positioned within the first and second runners and the flexible panel whereby at least two adjacent decorative structures can be connected.

6. The decorative structure of claim 1, wherein the decorative structure is suspended from a ceiling.

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7. The decorative structure of claim 6, further including cables attached to the ceiling and the spreader bar.

8. The decorative structure of claim 1, wherein the first and second runners include a curved portion.

9. The decorative structure of claim 8, wherein the curved portion of the first runner is substantially similar to the curved portion of the second runner.

10. The decorative structure of claim 1, further including a slotted member resting within a groove in the runners whereby the spreader bar is attached to the frame elements by the slotted member.

11. The decorative structure of claim 1, wherein the first runner is spaced substantially parallel to the second runner.

12. A ceiling system comprising:

a plurality of decorative structures suspended from a ceiling wherein the decorative structures comprise a frame, a panel and a clip attaching the panel to the frame; and

a modular spacer bar attached to and positioned between at least two adjacent decorative structures.

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13. The ceiling system of claim 12, wherein the frame comprises at least two runners.

14. The ceiling system of claim 13, wherein the runners are substantially parallel.

15. The ceiling system of claim 13, wherein the runners include channels wherein the clip is seated.

16. The ceiling system of claim 13, further including a spreader bar spaced between and operatively connected to both the runners.

17. The ceiling system of claim 16, further including a slotted member operatively connected to each of the parallel runners for connecting the spreader bar to the parallel runners.

18. The ceiling system of claim 16, wherein the decorative structure is suspended on wires connected to the ceiling and the spreader bar.

19. The ceiling system of claim 16, wherein the decorative structure is suspended by posts connected to the ceiling and the spreader bar.

20. The ceiling system of claim 12, wherein the parallel runners include a curved portion.

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21. The ceiling system of claim 20, wherein the curved portions of the runners are substantially similar.

22. The ceiling system of claim 12, wherein the flexible panel is comprised of a material selected from the group consisting of metal, wood, plastic and fiber board.

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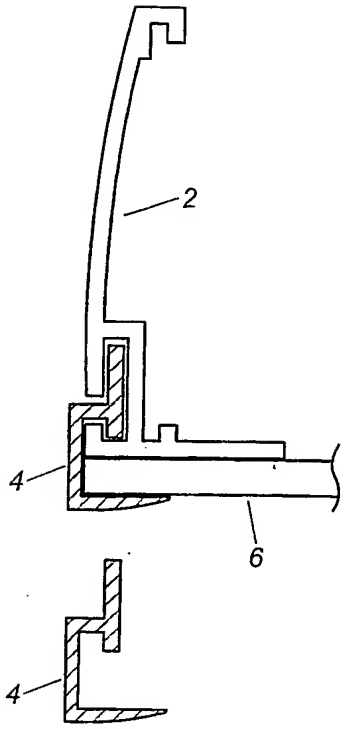

Fig. 1

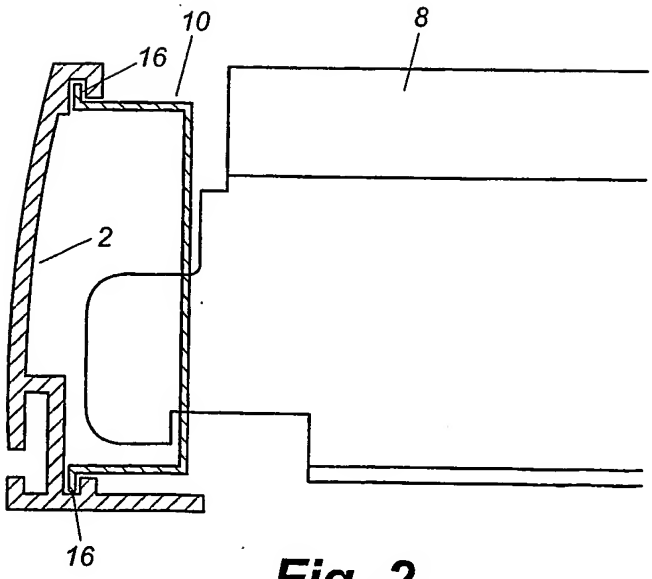

Fig. 2

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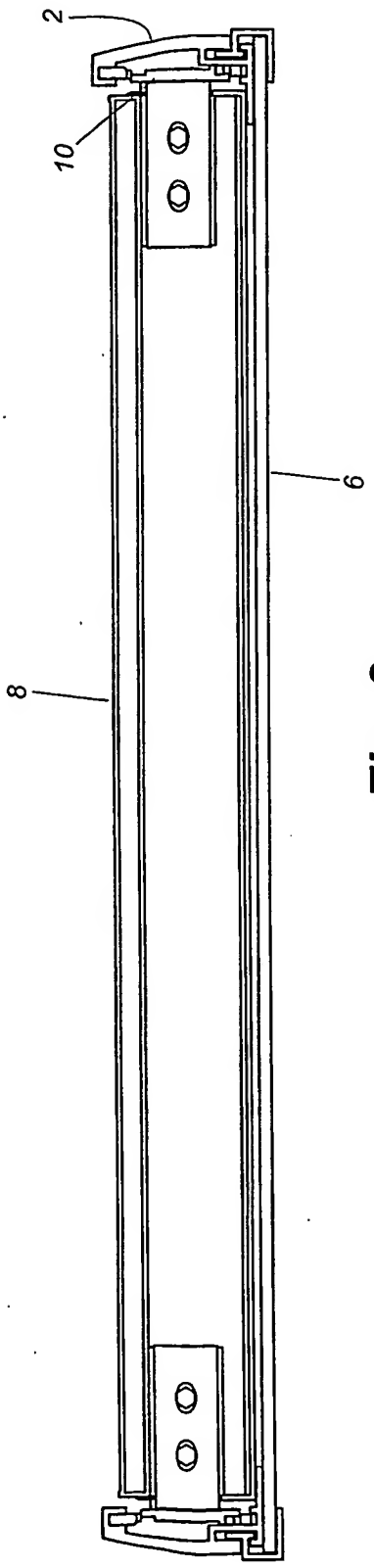

Fig. 3

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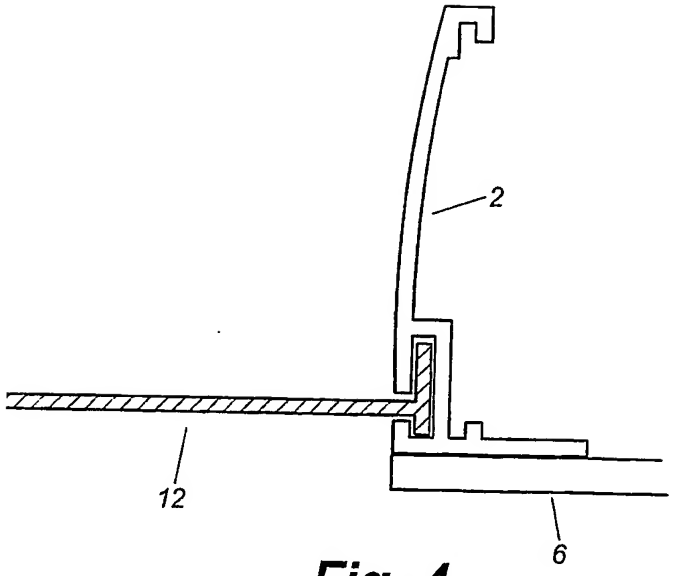

Fig. 4

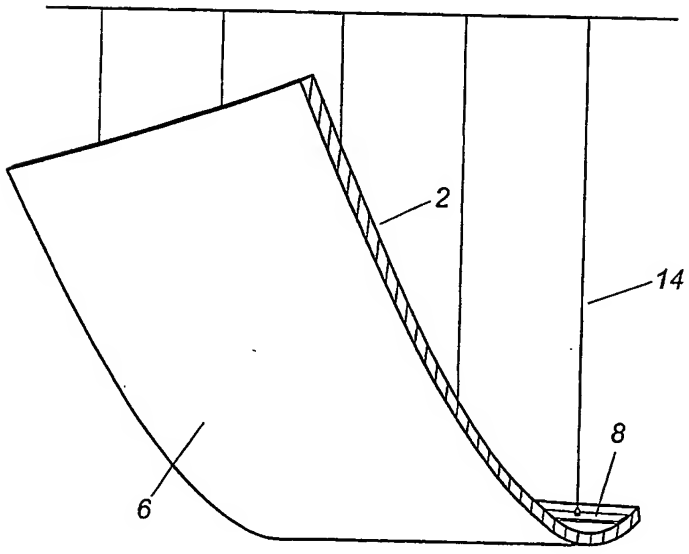

Fig. 5

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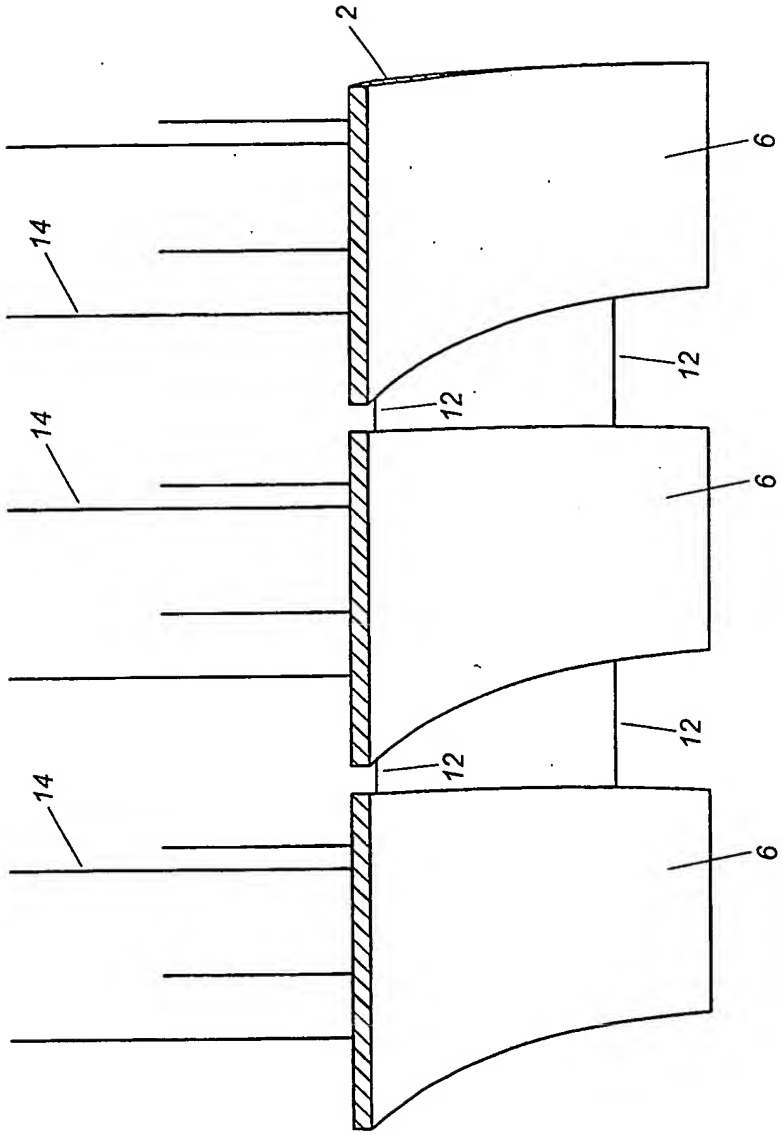

Fig. 6

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E04B9/34 E04B9/26 E04B9/04 E04B9/10 E04B9/12 E04B9/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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P,X	EP 1 160 389 A (USG INTERIORS) 5 December 2001 (2001-12-05) abstract; figures	1,2,6-9, 11
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X Y	US 4 744 188 A (AHREN) 17 May 1988 (1988-05-17) column 2, line 20 -column 5, line 36; figures 1-6	1-4,6,7, 10,11 5,12-19, 22
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Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
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